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Knowledge, attitudes and practices determinant's regarding hypertension in Moroccan hypertensive patients

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Abstract

Aim: The level of knowledge, attitudes and practices (KAP) of hypertension (HTN) determine largely the control of the disease. This study aimed to assess the KAP level regarding hypertension and its determinants in hypertensive patients residing in the Beni Mellal city, Morocco.

Material and Methods: A cross-sectional survey was carried out among 390 hypertensive patients attending primary health centres in the Beni Mellal city during 2019. Socio-demographic and clinical characteristics and data about KAP were collected using a structured questionnaire.

Results: The mean age of participants was 57.11 ± (11.42) years. Female participants were dominant (67.2%). Assessment of KAP of participants stated that 57.43% had good knowledge, 53.84% positive attitudes and 39.74% had good practices. Multivariate analysis revealed that advanced age (51 to 60 years (AOR (Adjusted Odds Ratio) 2.87[95% CI 1.58-5.21], p<0.05), ≥61 years (AOR 1.82 [CI 95% 1.01-3.29], p<0.05), low income (AOR 3.52 [CI95% 1.80-6.90], p<0.05) and the follow-up treatment in association with diet (AOR 6.23[CI 95% 1.33-29.04], p<0.05) were significantly associated with high knowledge scores. The oldest (AOR 2.045 [CI 95% 1.17-3.56], p<0.05), the widowed/er (AOR 5.06 [CI 95% 1.00-25.48], p<0.05) and those with low income (AOR 1.81 [CI 95%1.04-3.13], p<0.05) had positive attitudes. Low income was also associated with good practices (AOR 3.57 [CI 95% 2.04-6.23], p<0.05).

Discussion: Our results indicated that the participants' KAP level was relatively low. Therefore, special attention should be given to elderly hypertensive patients, those with low monthly income, widowers and those combining treatments and diet.

Keywords

Hypertension; Knowledge; Attitudes; Practices; Determinants

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Introduction

Hypertension (HTN) constitutes the main risk factor for cardiovascular diseases [1]. This disease kills an estimated nine million people each year [2]. In addition, the control rate has not improved steadily [2], and the prevalence of non-adherence to treatment is still high [3]. This could be indicative of the weakness in knowledge, attitudes and practices (KAP) of pathology, notwithstanding the role that HTN KAPs play in the control and management of the disease [4]. Thus, a low level of knowledge can lead to bad practices, and therefore poor control of BP [4] and negatively affect the lifestyle of hypertensives patients [5]. It has been found that about three-fourths of hypertensives patients in developed and developing countries inadequately manage their disease [4]. Also, hypertensives patients' attitudes have a significant impact on the management of the disease, they largely determine the practices adopted by patients [6].

The KAP level of HTN depends on a set of factors. In America, the KAP level was determined by age, ethnicity, gender, education and income [7]. Sadeq and Lafta in Iraq showed that the level of knowledge was significantly associated with age, gender and the presence of the family history of the disease. The same, attitude was significantly associated with age, educational level and family history, while practices were significantly associated with age and duration of disease [8].

In a study conducted in Zimbabwe by Chimberengwa et al., (2019), it was discovered that gender, educational level, and disease duration all have a substantial impact on the disease's KAP level [9]. Studies on the assessment of KAP and its associated factors in developing countries are very scarce and limited; they are even non-existent in the Arab Maghreb countries to our knowledge.

In Morocco, a study carried out by Tazi et al., (2003) reported that the prevalence of hypertension was 33.6% and 78% were unaware that they are sick, and 87.3% of treated hypertensive patients had uncontrolled BP [10]. A similar prevalence was found by Ziyyat et al., (2014) in the East of Morocco [11]. An international multicentre study by Nejjari et al., (2013) showed that the prevalence of hypertension was 45.4% [1]. On the other hand, Alami et al., (2017) reported that more than half of the hypertensive patients included in their study did not achieve adequate blood pressure control [12]. In the same line, Essayagh et al., (2019) have shown that the prevalence of uncontrolled high blood pressure represented 73% [13], and the prevalence of drug non-adherence represented 91% [3].

However, these studies were not addressed to KAP. Since poorer blood pressure control and non-adherence to treatment may be linked to insufficient knowledge and inadequate attitudes and practices of people with hypertension, and fill this crucial gap, the present study aimed to assess the level KAP of hypertension and to investigate its determinants in Moroccan hypertensive patients.

Material and Methods

Type of study and population

This was a cross-sectional survey aimed to determine KAP levels and associated factors among 390 hypertensives attending the primary health centres in Beni Mellal city between January and March 2019. A systematic sampling method was adopted. Participants aged 18 years and above, physically and mentally capable of providing the data necessary and willing to participate in the study were included. Pregnant women, health providers and hospitalized patients were excluded.

Procedure

Using a questionnaire administered through a face-to-face interview, we collected socio-demographic, clinical characteristics, self-care practices and, KAP of hypertensive patients. One mark was given for a correct answer and a zero for an incorrect. The cut-off points for knowledge were stratified into two levels: poor (0–9) and good (>9). Attitudes scoring levels were stratified as negative (0–5) and positive (>5). The level of practices was divided into poor (0–4) and good (>4).

Ethical approval

The approval for this study was obtained from the Moroccan Ministry of Health on March 03, 2016 (reference number: 6397-3/3/2016). Participation was voluntary and anonymous. Participants were informed about the study objective and they also read carefully and signed the consent form. All data were confidential and protected at all stages of the study.

Statistical analyses

Statistical analysis was carried out using SPSS version 19. The x2 test was used to assess the statistical significance between the dependent variable (KAP level) and potential explanatory variables. All significant variables in the x2 test analysis ($p<0.05$) were considered in the multivariate logistic regression model to determine independent factors associated with KAP level.

Results

Population characteristics

The study group consisted of 390 hypertensive patients, among whom female participants predominated (67.2%). The mean age of the participants was 57.11 ± (11.42) years. The married participants were the most represented. In addition, 44.4% of our sample were illiterate and 75.4% were unemployed. Hypertensives with a disease duration of less than 5 years accounted for 46.7%, as shown in Table 1.

Knowledge, attitudes and practices regarding HTN

The ideal diastolic figure was recognized by 18.72% surveyed, the headache was the most identified sign (92.05%), and cardiovascular complications were reported by 72.82%. The majority of respondents (95.12%) declared following a diet and taking medication, while 23.07% used traditional treatment. Practices aiming to reduce salt and fat in the diet were reported by 87.69% and 70%, respectively. In addition, 33.07% of the participants thought that it was possible to stop antihypertensive therapy, 18.72% thought that they could take it at any time of the day, 38.47% thought that being overweight doesn't constitute a risk for hypertension and finally, 23.07% perceive HTN as a curable disease (Table 2).

Multivariate analysis model

The multivariate analysis (Table 3) shows that the probability of having good knowledge was significant in hypertensive patients aged 50 to 60 years and ≥61 years ((p=0.046 CI95%: 1.01-3.29), (p=0.001 CI95%: 1.58-5.21)), in participants with income <3000MAD (p=0.001 CI95%: 1.80-6.90), in patients who followed a combination of diet and drugs (p=0.02 CI95% : 1.33-29.04).

The results showed also that hypertensive patients aged more than 60 years (p=0.01 CI95%: 1.17-3.56), the widowed hypertensives (p=0.04 CI95%: 1.00-25.48) and, participants who had a monthly income below 3000MAD (p=0.03 CI95%: 1.04-3.13) have all positive attitudes. Regarding practices, hypertensive patients with an income <3000MAD adopt good practices (p=0.001; CI95%: 2.04-6.23).

Table 1. Characteristics of study participants.

Variables	n (%)
Gender	
Male	128 (32.8)
Female	262 (67.2)
Age group (years)	
≤50	115 (29.5)
51 to 60	120 (30.8)
≥61	155 (39.7)
Marital status	
Single	13 (3.3)
Married	276 (70.8)
Divorced	21 (5.4)
Widow/er	80 (20.5)
Educational level	
Illiterate	173 (44.4)
Primary	141 (36.2)
Secondary	60 (15.4)
Superior	16 (4.0)
Occupational status	
Employed or self employed	73 (18.7)
Unemployed	294 (75.4)
Retired	23 (5.9)
Household status	
Alone	23 (5.9)
With family	367 (94.1)
Household income in MAD/month*	
< 1000	95 (24.4)
1000 to2000	112 (28.7)
2000 to 3000	94 (24.1)
3000 to 5000	65 (16.7)
> 5000	24 (6.1)
Duration of the HTN (years)	
<5	182 (46.7)
5 to 10	142 (36.4)
> 10	66 (16.9)

* Moroccan Dirham: MAD (1MAD= 0,094 Euros) HTN: Hypertension

Table 2. Knowledge, attitudes and practices regarding hypertension

Knowledge	n (%)
Ideal BP figures	
Systolic	241(61.78)
Diastolic	73(18.72)
Symptoms	
Headaches	359(92.05)
Dizziness, tinnitus	327(83.84)
Heaviness of the neck	165(42.31)
Risk factors for hypertension	
Physical inactivity	167(42.82)
Obesity	199(51.02)
Salt without moderation	359(92.05)
High fat foods	149(38.20)
Diabetes	189(48.46)
Tobacco	128(32.82)
Stress	287(73.58)
Complications	
Locomotor (paralysis)	213(54.61)
Cardiac	284(72.82)
Kidney	157(40.25)
Oculars	206(52.82)
Food and HTN	
Food increase	234(60)
Food decrease	134(34.36)
Sources of information	
Hypertensive patients	216(55.38)
Family members	179(45.89)
Media	121(31.02)
Health providers	265(67.94)
Awareness campaign	47(12.05)
Attitudes and practices	
Satisfaction with BP figures	
Yes	180(46.15)
No	104(26.67)
Don't know	106(27.18)
Practices and preventive measures	
Salt reduction	342(87.69)
Physical activity	140(35.89)
Fat reduction	273(70)
Weight reduction	142(36.41)
Adherence to treatment	
Is only one drug used to treat HTN?	143(36.66)
It is possible to stop treatment?	129(33.07)
What time of day do you receive your treatment?	
Morning	302(77.43)
At any time of the day	73(18.71)
I don't know	16(04.10)
Does getting treatment reduce the risk of MI*?	230(56.41)
Current treatment	
Diet	18(04.61)
Diet/drugs	371(95.12)
Traditional treatment	90(23.07)
Perception of self-care practices	
Do you think that:	
Lifestyle changes help to manage HTN?	262(67.18)
Overweight promotes HTN?	240(61.53)
Endurance sports lower HTN?	1734(4.53)
Do you measure your BP regularly?	353(90.51)
Do you think HTN is?	
Chronic disease	227(58.20)
Cureable disease	90(23.07)
Serious illness	307(78.71)
Cardiovascular risk factor	289(74.10)

* MI: Myocardial Infarction; BP: Blood Pressure; HTN: Hypertension

Table 3. Multivariate analysis of factors associated with KAP

Knowledge					
	Good (n=224)	Poor (n=166)	X^2 (P-value)	AOR (CI :95%)	P-value
Age group (years)			0.00		
≥61	74	72		1.82 (1.01-3.29)	0.046*
51 to 60	52	66		2.87 (1.58-5.21)	0.001*
≤50	98	28		Reference	
Educational level			0.011		
Literate	81	40		0.63 (0.39-1.05)	0.079
Illiterate	143	126		Reference	
Occupational status			0.010		
Non-employed	158	136		1.23 (0.70-2.15)	0.460
Employed	66	30		Reference	
Area of residence			0.003		
Urban	213	144		0.47 (0.21-1.05)	0.068
Rural	11	22		Reference	
Household income in MAD/month			0.001		
≤3000	148	152		3.52 (1.80-6.90)	0.001*
>3000	76	14		Reference	
Treatment			0.002		
Diet / Drugs	206	164		6.23 (1.33-29.04)	0.02*
Diet	18	2		Reference	
Attitudes					
	Positives (n=210)	Negatives (n=180)	X^2 (P-value)	AOR (95%CI)	P-value
Age group (years)			0.001		
≥61	61	85		2.045 (1.17-3.56)	0.012*
51 to 60	64	54		1.29 (0.74-2.26)	NS
≤50	85	41		Reference	
Marital status			0.006		
Widower/er	32	48		5.06 (1.00-25.48)	0.049*
Divorced	10	11		5.71 (0.97-33.50)	NS
Married	157	119		3.51 (0.74-16.57)	NS
Single	11	2		Reference	
Household income in MAD/month			<0.01		
≤3000	147	153		1.81 (1.04-3.13)	0.033*
>3000	63	27		Reference	
Practices					
	Good (n=155)	Poor (n=235)	X^2 (P-value)	AOR (95%CI)	P-value
Age group (years)			<0.01		
≥61	45	101		1.51 (0.85-2.67)	NS
51 to 60	42	76		1.39 (0.78-2.44)	NS
≤50	68	58		Reference	
Marital status			0.048		
Widower/er	22	58		1.76 (0.47-6.49)	NS
Divorced	11	10		0.84 (0.19-3.68)	NS
Married	115	161		1.30 (0.39-4.30)	NS
Single	7	6		Reference	
Household income in MAD/ month			<0.01		
≤3000	95	205		3.57 (2.04-6.23)	0.001*
>3000	60	30		Reference	

NS: not significant. * Statistically significant at p <0,05. AOR: Adjusted Odds Ratio
CI: Confidence Interval

Discussion

This study have demonstrated that the rate of hypertension incidence is higher among respondents aged over 50 years, which is consistent with the study conducted by Essayagh T, et al. [13]; they found that 88.3% of hypertensive patients were aged over 50 years, in addition, Ziyyat et al., (2014) reported that the frequency of HTN was 52.6% and 51.5% for subjects aged over 70 years among women and men, respectively [11]. This association is logical, because the human body accumulates, over time, the risk factors for HTN [11].

Our findings also revealed that the hypertension patients were predominantly females, similar to other studies [10,14,13]. A possible explanation for this could be that hormonal changes in females play an essential role in the mechanism of hypertension, which may lead to a higher prevalence of the disease in women than in men [15].

This study found that hypertension was more prevalent in married participants, which was in accordance with national study that reported that married people had a greater risk of developing hypertension [13]. This could be due to the fact that marriage may adversely affect physical health and increase the risk of certain diseases by putting more pressure on individuals, such as childbirth and the negatively changing lifestyles of married individuals [16].

Our results showed that the level of KAP was relatively low. Furthermore, the determinants of KAP level were advanced age, low monthly income, a combination of diet and drugs, and marital status. The scarcity of studies addressing the KAP towards HTN in Morocco did not allow us to compare our results with other national studies.

Comparing our results with those generated by surveys mainly carried out in developing countries showed that the KAP scores are similar. A study conducted in Iraq (Baghdad) by Sadeq and Lafta showed that 60.1% of respondents had good knowledge, 81.9% had positive attitudes and 24.5% had good practices [8]. In Saudi Arabia, it has been reported that the hypertensives surveyed had good knowledge of positive attitudes, but an insufficient level of practice [17,18]. Besides, a study carried out in Jordan concluded that most of the participants were well informed and had positive attitudes towards hypertension [19]. However, other studies have found high KAP scores compared to our study. In Nigeria, where scores were 56.56% for good knowledge, 95.56% for positive attitudes and 57.19% for good practice [20], as well as in the USA[7] and in Mongolia [21]. According to these findings, cultural, socio-demographic and economic similarities may be responsible for the resemblance of the results for the studies carried out in Arab-Muslim contexts with those in other contexts.

Concerning factors associated with KAP level, regression analysis showed that there was a highly significant association between age and good knowledge, which is in accordance with the findings of the Iraqi study reporting that older people showed better knowledge than younger people [8]. Similarly, in the USA, in Mongolia and in Nigeria, studies have shown that the more the hypertensive person advances in age, the more they show good knowledge [7,21,20].

In contrast, other studies conducted in Saudi Arabia [17,18] showed that the level of knowledge decreases with advancing

age. It should be inferred that fear of developing complications from the disease, affected hypertensives begins to request, read and collect information about the disease and promote their long-term health and well-being. Also, as the severity of HTN is accentuated in older people, therefore this category of hypertensive patients learns more about hypertension to take the necessary preventive measures[8,14].

Regarding income, respondents with low monthly income had a good level of knowledge, which is in line with a study carried out by the employees of the ministerial department in Lomé in Togo. They reported that 87.4% of employees had a poor level [22]. However, a study leaded in Nigeria asserted that principally patients with high-income level had good knowledge of HTN [20]. Besides, many studies have suggested that hypertension negatively affects populations in low- and middle-income countries with weak health systems [23]. Fear of not being able to cover the expenses linked to the management of hypertension complications, especially, cardiovascular diseases, seems to be the major reason for which patients with low income ask more about their disease to manage it correctly and subsequently to prevent complications.

The treatment modality had a significant effect on the level of knowledge. Thus, hypertensives following both a diet and antihypertensive treatment have shown a higher level of knowledge than those who follow a diet only. In the same line, a Palestinian study claimed that follow-up antihypertensive therapy is one of the factors associated with higher scores of knowledge on hypertension [24].

Concerning the factors that influence the attitudes, our results are consistent with previous study also reporting a positive attitude in older people [8] When the marital status is considered, our results are in accordance with others studies that found that marital status was significantly associated with high score of positive attitudes, which were more presented in unmarried people [24,25]. This may be due to the fact that widowers, who were previously married people, frequented health facilities more and met their staff, who gave them educational messages. Concerning income, the results depicted in our study are in agreement with those reported in Lomé in Togo, showing that positive attitudes are more developed among those who have a low socioeconomic level [22]. In contrast to our study, the Palestinian study found that high income was associated with higher attitude scores. Also, this opposition has been affirmed by other studies [21,7]. Finally, our study showed that older hypertensive patients perceive positively their disease. Similarly, previous studies have shown that the majority of older patients, when diagnosed with hypertension, became frustrated and started to read, ask about, and collect information about their condition [8]. In fact, positive attitudes of elderly hypertensive subjects can be explained by their high level of knowledge about their disease [8,14].

In terms of practice, a statistically significant association was found between low income and good practices. In contrast, studies have shown that a higher socioeconomic level of hypertensive patients makes it possible to cover the expenses linked to treatment and follow-up, and therefore, ensure good control of their disease [21,7]. Besides, in Saudi Arabia, a study has shown that good practices are associated with high socioeconomic status [18], other studies concluded that bad practices, in particular, poor treatment, could be associated with the high cost of drugs and inability to cover them [8]. Indeed, hypertensive patients who have sufficient financial resources, engaged less in practices in favour of the control and good management of hypertension, besides, they expressed no feeling of fear or worry (negative attitude) because they could afford to cover the costs associated with their illness's treatment and complications. However, hypertensive patients with low socio-economic levels have adopted good practices, fearing to develop hypertension complications and not being able to cover the resulting expenses, so they invest more in secondary prevention.

It was the first study of this type and with such an objective carried out in Morocco. The response rate in this study was high (94.75%). In contrast, the generalization of these results has certain limitations. First, the sample was limited to patients belonging to the population served by PHCF of Beni Mellal. The second limitation was the inability of the cross-sectional study to determine a causal relationship between the KAP and characteristics of hypertensive patients. Finally, there was no standardized instrument for measuring KAP about hypertension.

Conclusions

This study showed that the KAP level of the hypertensives surveyed was relatively low. Our finding revealed that advanced age, low income and the follow-up treatment in association with diet were significantly associated with high knowledge scores. The widowed/er and those with low income had positive attitudes. For practices, low income was the only factor associated with good practices. Thus, further effective health education programs are greatly needed to improve the KAP of hypertension in the studied population.

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Scientific Responsibility Statement
The authors declare that they are responsible for the article's scientific content including study design, data collection, analysis and interpretation, writing, some of the main line, or all of the preparation and scientific review of the contents and approval of the final version of the article.

Animal and human rights statement
All procedures performed in this study were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. No animal or human studies were carried out by the authors for this article.

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Conflict of interest
No conflicts of interest have been declared.

References

1. Nejjari C, Arharbi M, Chentir M-T, Boujnah R, Kemmou O, Megdiche H, et al. Epidemiological Trial of Hypertension in North Africa (ETHNA): an international multicentre study in Algeria, Morocco and Tunisia. J Hypertens. 2013; 31(1):49-62. DOI: 10.1097/HJH.0b013e32835a6611.

2. Dorans KS, Mills KT, Liu Y, He J. Trends in prevalence and control of hypertension according to the 2017 American college of cardiology/American heart association (ACC/AHA) guideline. J Am Heart Assoc. 2018; 7(11). DOI: 10.1161/JAHA.118.008888.

3. Essayagh M, Essayagh T, Essayagh S. Drug non-adherence in hypertensive patients in Morocco, and its associated risk factors. European Journal of Cardiovascular Nursing. 2021; 20(4):324-30. DOI: 10.1093/eurjcn/zvaa002.

4. Malik A, Yoshida Y, Erkin T, Salim D, Hamajima N. Hypertension-related

knowledge, practice and drug adherence among inpatients of a hospital in Samarkand, Uzbekistan. Nagoya J Med Sci. 2014; 76(3-4):255–63.
5. Kumar C, Sagar V, Kumar M, Kiran K. Awareness about hypertension and its modifiable risk factors among adult population in a rural area of Ranchi district of Jharkhand, India. International Journal of Community Medicine and Public Health. 2016; 3(5):1069–73.DOI: 10.18203/2394-6040.ijcmph20161359
6. Bollampally M, Chandershekhar P, Kumar K, Surakasula A, Srikanth S, Reddy T. Assessment of patient's knowledge, attitude and practice regarding hypertension. Int J Res Med Sci. 2016; 4(8):3299–304. DOI: 10.18203/2320-6012.ijrms20162283.
7. Oliveria SA, Chen RS, McCarthy BD, Davis CC, Hill MN. Hypertension knowledge, awareness, and attitudes in a hypertensive population. J Gen Intern Med. 2005; 20(3):219–25. DOI: 10.1111/j.1525-1497.2005.30353.x.
8. Sadeq R, Lafta RK. Knowledge, attitude and practice about hypertension in hypertensive patients attending hospitals in Baghdad, Iraq. SE Asia J Pub Health. 2017; 7(1):29–34. DOI: 10.3329/seajph.v7i1.34676
9. Chimberengwa PT, Naidoo M, cooperative inquiry group. Knowledge, attitudes and practices related to hypertension among residents of a disadvantaged rural community in southern Zimbabwe. Isangula KG, editor. PLoS One. 2019; 14(6):e0215500. DOI: 10.1371/journal.pone.0215500.
10. Tazi MA, Abir-Khalil S, Chaouki N, Cherqaoui S, Lahmouz F, Sraïri JE, et al. Prevalence of the main cardiovascular risk factors in Morocco: results of a National Survey, 2000. J Hypertens. 2003; 21(5):897–903. DOI: 10.1097/00004872-200305000-00013.
11. Ziyyat A, Ramdani N, Bouanani NEH, Vanderpas J, Hassani B, Boutayeb, A et al. Epidemiology of hypertension and its relationship with type 2 diabetes and obesity in eastern Morocco. Springer Plus. 2014; 3(1):644. DOI:10.1186/2193-1801-3-644.
12. Alami M, El Hattaoui M, Seqat M, Sadik J, Aouad A, Benghanem Gharbi M. Control of blood pressure and cardiovascular risk in Moroccan patients with newly diagnosed hypertension: a 3-month observational study in primary care. Therapeutic Advances in Cardiovascular Disease. 2017; 11(2):49–56. DOI: 10.1177/1753944716677242.
13. Essayagh T, Essayagh M, El Rhaffouli A, Khouchoua M, Bukassa Kazadi G, Khattabi A, et al. Prevalence of uncontrolled blood pressure in Meknes, Morocco, and its associated risk factors in 2017. PLoS One. 2019; 14(8):e0220710. DOI: 10.1371/journal.pone.0220710.
14. Mohammed AH, Hassan BAR, Suhaimi AM, Ali AHHD. Hypertension knowledge, awareness, and attitude among the hypertensive population in Kuala Lumpur and rural areas in Selangor, Malaysia. J Public Health (Berl). 2019; DOI:10.1007/s10389-019-01160-7.
15. Shirani S, Gharipour M, Khosravi A, Kelishadi R, Habibi HR, Abdalvand A, et al. Gender differences in the prevalence of hypertension in a representative sample of Iranian population: the Isfahan healthy heart program. Acta Biomed. 2011; 82(3):223–9.
16. Wang J, Sun W, Wells GA, Li Z, Li T, Wu J, et al. Differences in prevalence of hypertension and associated risk factors in urban and rural residents of the north eastern region of the people's republic of China: A cross-sectional study. PLoS One. 2018; 13(4):e0195340. DOI: 10.1371/journal.pone.0195340.
17. Siddiqua A, Mohammed AA, Alahmari EA, Hadaddi FA, Saleh NA. Study on the knowledge, attitude and practice (KAP) of patients with hypertension in Aseer hospital, Asir region; Saudi Arabia. Int J Res Pharm Sci. 2017; 7(2):37–41.
18. Bakhsh LA, Adas AA, Murad MA, Nourah RM, Hanbazazah SA, Aljahdali AA, et al. Awareness and knowledge on hypertension and its self- care practices among hypertensive patients in Saudi Arabia. AIMDR. 2017; 2(5). DOI: 10.21276/aimdr.2017.3.5.ME13.
19. Yasein N, Shhakhatreh F, Suleiman A, Barghouti F, Halaseh L, Abdulbaqi N. Knowledge, attitudes and practices on hypertension in patients attending family practice clinics. Health Med J. 2011; 5.
20. Aghoja OC, Okinedo PO, Odili VU. Knowledge, attitude and practice of hypertensive patients towards hypertension in a secondary health care facility in delta state. UK Journal of Pharmaceutical Biosciences. 2017; 5(2):24. DOI: 10.20510/ukjpb/5/i2/155972.
21. Demaio AR, Dugee O, Amgalan G, Maximenco E, Munkhtaivan A, Graeser S, et al. Protocol for a national, mixed-methods knowledge, attitudes and practices survey on non-communicable diseases. BMC Public Health. 2011; 11(1):961. DOI: 10.1186/1471-2458-11-961.
22. Yayehd K, Damorou F, Ehlan E, Kara P, N'Da NW, Tété Y, et al. Knowledge about arterial hypertension, attitudes and lifestyle among the employees of a ministerial department in Lomé, Togo. Angiology. 2012; 64(3):10
23. Lloyd-Sherlock P, Beard J, Minicuci N, Ebrahim S, Chatterji S. Hypertension among older adults in low- and middle-income countries: prevalence, awareness and control. Int J Epidemiol. 2014; 43(1):116–28. DOI: 10.1093/ije/dyt215
24. Sa'adeh HH, Darwazeh RN, Khalil AA, Zyoud SH. Knowledge, attitudes and practices of hypertensive patients towards prevention and early detection of chronic kidney disease: a cross sectional study from Palestine. Clin Hypertens. 2018; 24(1):6. DOI: 10.1186/s40885-018-0091-7
25. Manfredini R, De Giorgi A, Tiseo R, Boari B, Cappadona R, Salmi R, et al. Marital status, cardiovascular diseases, and cardiovascular risk factors: a review of the evidence. J Womens Health (Larchmt). 2017; 26(6):624–32. DOI: 10.1089/jwh.2016.6103

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